

Training trainers to protect America's tribal communities against pesticide illnesses & injuries

By Jennifer Weber

Representatives from the Inter Tribal Council of Arizona, Inc. (ITCA) have been working with Center investigators on a project that focuses on improving the health of tribal community members in California, Arizona and across America. The result so far has been a series of workshops titled "Pesticide Illnesses and Injuries: A Workshop for Tribal Community Health Care and Agricultural Professionals," which were held in May in Yuma and Phoenix.

The collaboration for this project began when Patrick O'Connor-Marer, Center deputy director and pesticide safety education coordinator with the UC Statewide Integrated Pest Management (IPM) Project, invited Michael Vaughn, pesticide program coordinator for ITCA, to attend a pesticide illnesses and injuries train-the-trainer workshop held in St. Helena, Calif.

The St. Helena workshop was the fourth that Center investigators had offered to educate health care providers and community members about recognizing, managing and reporting pesticide illnesses and injuries. This course is modeled after the UC Statewide IPM Program's



Henry Ghiotto

During a Pesticide Illnesses and Injuries workshop in Phoenix, attendees use the information and resources they receive to diagnose a possible pesticide exposure case during a role-play activity.

Chemical exposure alarmingly high in Thailand's Hmong farmers

Thailand's Hmong farmers view pesticides as beneficial because of their ability to kill insects or weeds, and to increase yield, speed production and reduce the amount of labor required. Population growth, restrictions on access to land, control of poppy production, and desire for cash income have resulted in increased use of pesticides for permanent field cultivation of cash crops. Although most Hmong farmers are aware of the health hazards involved in use of these chemicals, many fail to use adequate protective clothing to prevent exposure, reported Drs. Peter Kunstadter of the UC San

Francisco/Fresno Medical Education program, and Tippawan Prapamontol of Chiang Mai University.

In July, Kunstadter and Prapamontol visited the UC Davis campus, and presented a seminar titled "Pesticide exposure of ethnic minority Hmong farmers in North Thailand," based on their studies of three rural highland Hmong communities and urban Chiang Mai.

Pesticides, particularly those in the organophosphate and carbamate groups, are widely used in Thailand for agriculture and control of pests. Almost all study participants (97.8 percent of rural and 89.6 percent of urban

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train-the-trainer workshops for instructors of pesticide handlers and field workers. The course includes hands-on activities that provide participants with ideas for developing their own pesticide illness and injury management programs.

"I liked the interactive format of the workshop and thought that it would be an effective way to present pesticide information to tribal community health care providers in Arizona," Vaughn explained.

The ITCA was established in 1952 to provide a united voice for tribal governments in the state of Arizona. In 1975, the council established a non-profit corporation to promote Indian self-reliance by obtaining, analyzing and disseminating information vital to Indian community self-development. After presenting the train-the-trainer workshop idea to ITCA pesticide program administrator Elaine Wilson, and several tribal pesticide inspectors, Vaughn met with health care providers in the Yuma area to determine their needs for pesticide illness and injury information.

"I discovered that even though a few nurses and health department

staff had attended pesticide courses in the past, there was still a lot of interest in receiving more information about recognizing and reporting pesticide poisonings," said Vaughn. He therefore began to coordinate efforts with UC Statewide IPM Program staff members O'Connor-Marer, Jennifer Weber and Gale Perez to develop a program that would fit the specific needs of health care and agricultural professionals who work with tribal communities.

One of the first steps organizers took was to expand upon the current team of California-based instructors. "We thought it was important that people attending the workshops would have local resources and contacts that they could refer to should they have questions about reporting cases or needed additional help locating outreach materials," O'Connor-Marer said.

Since some of the tribal lands are located in both California and Arizona, project planners decided that instructors should represent pesticide education programs, regulatory agencies and organizations from both states. Instructors included Richard Ames, chief research scientist with the Cal/EPA Office of Environmental Health Hazard Assessment; Ernesto Arvizu, epidemiology specialist for Arizona Department of Health Services; Louis Carlo, assistant in extension at the University of Arizona; Henry Ghiotto, pesticide inspector with the Quechan Indian Tribe; Patrick O'Connor-Marer, Pesticide Safety Education Program coordinator for UC Davis; Michael O'Malley, director of Employee Health Services at UC Davis and medical



Henry Ghiotto

Elaine Wilson, Pesticide Program Administrator for the Inter Tribal Council of Arizona Inc., welcomes attendees to the Pesticide Illnesses and Injuries Workshop in Yuma.

consultant for California Department of Pesticide Regulation; Michael Vaughn, pesticide training coordinator for Inter Tribal Council of Arizona, Inc.; Jennifer Weber, pesticide safety educator at UC Davis; Barry Wilson, professor and biologist at UC Davis; and Elaine Wilson, pesticide program administrator with Inter Tribal Council of Arizona, Inc.

Three full-day workshops were presented in Yuma on May 29 and 30, and in Phoenix on May 31. Through the workshops, attendees gained a better understanding of the types of pesticide exposure cases that occur most frequently in Arizona and California. Presentations and reference materials were also provided to assist in the recognition, management and monitoring of pesticide poisonings. Attendees received an overview of the pesticide illness and injury reporting process and learned of the importance of reporting these

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injuries and illnesses. They also learned of the role of tribal pesticide inspectors and ITCA in protecting the health and environment of tribal communities. Hands-on activities were included in a case study session that allowed attendees to practice using the information and tools that they received during the workshop.

"The workshops were well attended, and we were impressed by the number of people who are working directly with tribes on pesticide-related issues," O'Connor-Marer said. Among the participants were physicians, nurses, outreach workers, industrial hygienists, pesticide educators and first responders, such as firefighters,

paramedics and police officers. About 15 tribes were represented at the workshop, including Omaha Tribes of Nebraska and Omaha Tribes of Iowa.

"Even though we have offered these workshops for several years in California, this was the first time that we have had the opportunity to work with tribal community members," O'Connor-Marer said. "We hope to continue our collaborations as it is a great benefit for researchers and educators to learn more about the health and safety needs of the entire agricultural community."

Instructors received positive feedback about the workshops. Most attendees stated that they acquired new information and resources that they would use to educate coworkers

and community members about preventing pesticide exposure and responding to emergencies. A fire department captain who attended one of the courses in Yuma wrote, "This is a very valuable course for every health care worker as well as the general public."

Vaughn agrees and said that *Pesticide Illnesses and Injuries: A Workshop for Tribal Community Health Care and Agricultural Professionals* should continue. "I truly envision that this course will be held annually in Arizona and see a need for a national effort to offer the same type of workshop to tribal communities throughout the United States."



Former Chief of California's Division of Occupational Safety & Health Appointed Director of NIOSH

In July, the Department of Health and Human Services Secretary Tommy G. Thompson appointed John Howard, M.D., M.P.H., J.D., LL.M., as the new director of the U.S. Centers for Disease Control and Prevention's (CDC) National Institute for Occupational Safety and Health (NIOSH).

Dr. Howard served as chief of the Division of Occupational Safety and Health in the State of California's Department of Industrial Relations since September 1991. In this position, he administered all of the occupational and public safety programs in the Division and directed a staff of nearly 1,000.

Prior to his appointment as NIOSH director, Dr. Howard also was an assistant professor of envi-

ronmental and occupational medicine at the University of California, Irvine.

He served as medical director and chief clinician of the Philip Mandelker AIDS Prevention Clinic, an AIDS Community Services Clinic in Los Angeles, and as an assistant counselor to the under secretary of Health and Human Services.

Dr. Howard began his career in occupational health as internist in the University of California, Los Angeles School of Medicine Pulmonary Fellowship Program at Cedars-Sinai Medical Center in Los Angeles in 1979. During his clinical



work, he worked closely with asbestos-exposed shipyard workers and published research findings related to workplace asbestos exposure and occupational lung disease.

Kathleen M. Rest, Ph.D., M.P.A., who has served as NIOSH acting director since June 2001, will resume her duties as NIOSH deputy director.

NIOSH is the part of CDC that conducts research and makes recommendations for preventing work-related illnesses, injuries and deaths. It is headquartered in Washington, D.C., and has locations in Atlanta, Ga., Cincinnati, Ohio, Morgantown, W.Va., Pittsburgh, Pa., and Spokane, Wash.



UC Davis Farmer Health Study enters its 10th year

By Diane Mitchell

The factors that make California the dominant agricultural state are also those that make it distinct from other agricultural regions. The average California farm is obviously different from one in Virginia or Iowa, but until recently most of the studies concerning farming practices and health were based in other regions. In response, the Center's Farmer Health Study began assessing the health status of California's farmers and comparing that information with health data of farmers in other states, where increased risks for injury and illness have been recognized.

Center investigators surveyed a random sample of 1,947 California farms in 1993, representing the broad variety of farming practices throughout the state. To be included in the study, farms had to have an annual production of at least \$1,000, and participants interviewed had to be a primary operator with day-to-day management decisions—either the owner or manager. We found the average age of a farm operator to be 54–55 years, and only about 10 percent were women.

Compared to the rest of the United States, California has larger farms with many specialty crops, frequently requiring labor-intensive practices, from pruning to hand harvesting. With dry-climate farming predominating in much of the interior of California and soils containing high levels of inorganic minerals, including silicates and crystalline silica, the respiratory health of farmers is of particular

concern. In 1993 Center investigators began their study of respiratory health of California farm operators. A more in-depth investigation began in 1995, when researchers monitored a sub-sample of farmers working in Central Valley fields for their lung function and recorded breathing problems.

In 1998, Center investigators re-contacted participants from the earlier survey by phone. This follow-up interview of 1,349 farm operators was important as it allowed investigators to compare changes in health with changes in farming practices. (Information concerning spouses and children was also gathered in 1998 and will be reported another time.) Table 1 shows the percentage of farms in each region, categorized by their major commodity.

Approximately 17 percent (225) of the farmers from the 1993 survey were no longer a primary operator in 1998, although they may still have worked on a farm. The reasons given for this change were:

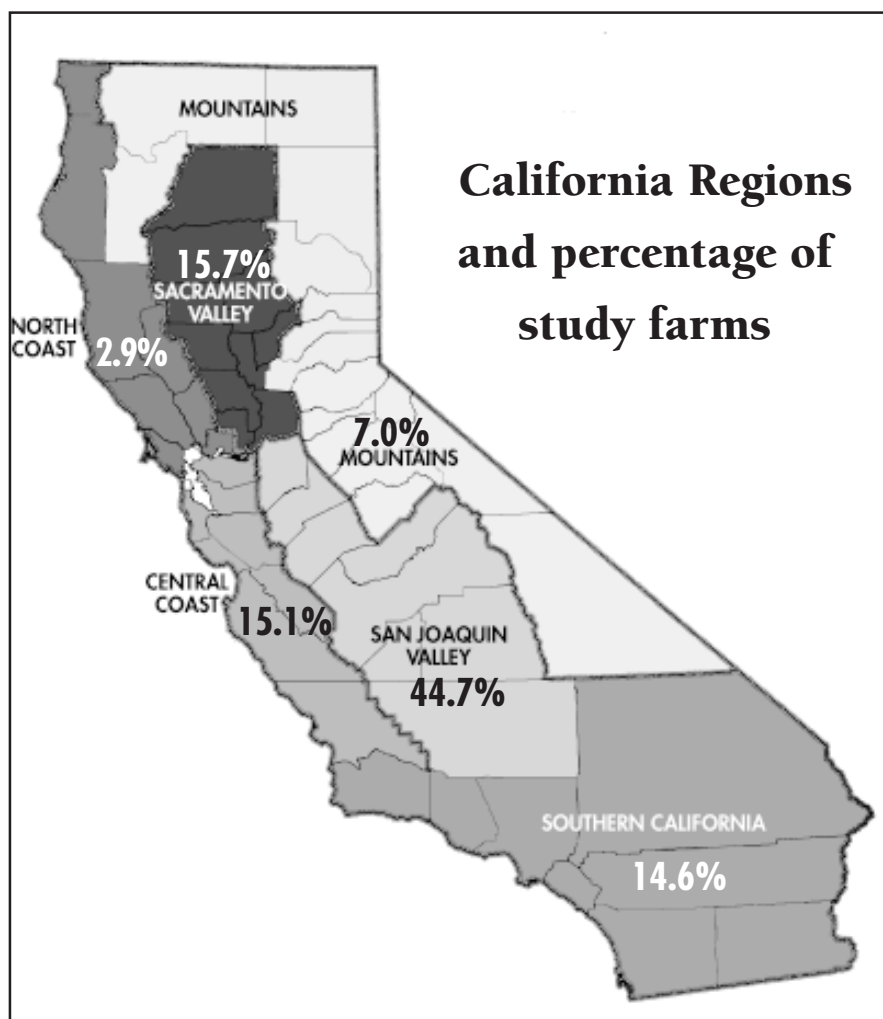
They had sold the farm	64 (28.4%)
They had leased out all the land	50 (22.2%)
They were no longer farming: the land was idle	21 (9.3%)
They no longer farmed, but hired a manager to farm the land	21 (9.3%)
They no longer operate the farm, but still work on it	21 (9.3%)
Other (not specified)	48 (21.3%)

HEALTH CHANGES

In 1993, after determining whether or not a farmer smoked, investigators observed that the

TABLE 1. PERCENTAGE OF FARMS IN EACH REGION BY MAJOR COMMODITY

REGION	Central Coast	Mountains	North Coast	Sacramento Valley	San Joaquin Valley	Southern California
% of Total Study Farms	15.1	7.0	2.9	15.7	44.7	14.6
Fruit	16	5	4.5	17	20	46
Nuts	6	1	6	25	22	3
Field Crops	7	12	4	23	10	7
Row Crops	11	3	2	4	4	4
Grapes	12	1	35	3	21	2
Nursery Produce	10	2	4	1	1	14
Animals	25	60	38	19	16	16
Other/Missing	13	15	6	8	6	8



longer farm operators worked in dusty jobs (often field work involving tractors), the higher the number of breathing problems (e.g., persistent wheeze, chronic cough or bronchitis). In 1995 Center investigators conducted a more in-depth study of breathing problems and determined that specific farming tasks involving exposure to hay or straw, operating tractors or mechanical harvesters were associated with an increased prevalence of persistent wheezing.

The 1998 survey confirmed that new cases of chronic cough and chronic bronchitis were associated with workplace exposure to dusty jobs, even when other factors known to be associated with these diseases

(e.g., smoking) were considered. Working in vineyards was observed to be another risk factor for respiratory symptoms.

In 1998, 9.3 percent of the farmers reported at least one injury over the preceding year—sprains and strains were most common, followed by fractures and open wounds. The farming characteristics that were predictive of injury included having had a previous injury, sustained medium or high physical exertion levels at work, spending time in workshop chores, working on a small field farm (less than 190 acres) or with horses. Farmers also were asked if they had functional limitations (whether they were able to perform common tasks such as

moving large objects, lifting or carrying heavy loads, extending limbs, writing or handling small objects and bending or crouching). The major factor associated with functional limitation was increasing age, but smoking status, gender, body mass index (an indicator of body size with respect to height) and alcohol consumption were also determinants of functional limitation). Interestingly, analysis showed that farmers with breathing problems had more functional impairment than similar farmers who did not report respiratory symptoms.

In the 1998 Farmer Health Survey update, farmers reported bone or joint problems (21.9%), accident or injury (14.3%) and nerve problems such as sciatica or a pinched nerve (11.6%) most interfered with their ability to work. We are looking at these and other health symptoms and analyzing the 1993 and 1998 data to determine connections between different types of farming, farming tasks, or some characteristic of the farm operator that may contribute to health problems.

USE OF THE STUDY RESULTS

Information gained from the Farmer Health Study will be used to benefit all California farmers. For example, the study has already indicated that much needs to be done to educate our state's farmers on how best to reduce the risks of injury and illness in farming. In 1998 more than 20 percent of farm operators surveyed stated they had suffered some sort of cancer—most commonly skin cancer (among those diagnosed with cancer ~ 85 percent were treated for skin cancer).

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COMPOSITION OF THE FARMING REGIONS BY COUNTY			
Region	% FHS Farmers	Counties in the Region	
North Coast	3.0%	Del Norte Humboldt Mendocino Sonoma	Lake Napa Marin
Central Coast	15.0%	San Mateo Santa Clara Santa Cruz Monterey San Benito	San Luis Obispo San Francisco Contra Costa Alameda
Sacramento Valley	16.0%	Shasta Butte Tehama Glenn Colusa	Sutter Yuba Sacramento Yolo Solano
San Joaquin Valley	44.0%	San Joaquin Stanislaus Merced Madera	Fresno Kings Tulare Kern
Mountains	7.0%	Modoc Plumas Lassen Sierra Nevada Placer El Dorado Amador	Calaveras Tuolumne Mariposa Inyo Mono Alpine Trinity Siskiyou
Southern California	15.0%	Santa Barbara Ventura Los Angeles Orange	San Diego Imperial San Bernardino Riverside

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Measures including reduction of sun exposure by the use of sun screen, long-sleeved shirts and hats with adequate brims (not baseball caps) will reduce the risk of this preventable cancer.

Similarly the study indicated that agricultural dust exposures are a

significant short- and long-term health hazard. Many tasks create or disturb respirable dusts that can cause or exacerbate allergic reactions such as asthma, or over the long term may cause chronic bronchitis or chronic obstructive lung disease. Where dust production is unavoidable, protective barriers need to be

used—from enclosed cabs on tractors to properly fitting and functioning dust masks. Scarves are almost worthless, as are many ill-fitting dust masks.

NEXT STEPS FOR THE STUDY

In 2002, we began a new phase of the Farmer Health Study with a follow-up study of the respiratory health of some of the farmers who had lung function tests on their farm in 1995/6. The new study involves a complete lung physical, so we are asking participants to come to the University of California, Davis, Medical Center in Sacramento as the examination equipment is not mobile. We will monitor up to 100 farmers offering them free accommodation and compensation for time lost and travel expenses.

After this intensive sub-study, we intend to contact as many people as possible in 2003/4 who participated in the 1998 study, including farming spouses, to continue monitoring farming practice and health changes. This follow-up study will evaluate several health conditions, such as respiratory disease, arthritis and cancer, as well as include questions on areas of special interest to the farmers in the study.

If you have questions about the study, are interested in receiving more information about a certain aspect of the study, or have suggestions for areas of enquiry, please contact Diane Mitchell, Farmer Health Study, Center for Health and the Environment, 3792 Old Davis Road, Davis, CA 95616; phone: (530) 752-1810, e-mail: dcmitchell@ucdavis.edu.



Silicosis and Mesothelioma in Rio de Janeiro

Two Brazilian researchers visited UC Davis last July to discuss their findings of under-diagnosed occupational disorders in the Rio de Janeiro area population. Vinicius Cavalcanti dos Santos Antão, M.D., M.Sc., and Germania Araujo Pinheiro, M.D., M.Sc., both from the Center for Occupational Lung Diseases at Rio de Janeiro State University, presented "Silicosis and Mesothelioma in the State of Rio de Janeiro, Brazil."

"Malignant mesothelioma is a rare tumor that can affect mainly the pleura, but also the peritoneum and pericardium," said Pinheiro, who revealed that exposure to asbestos (direct, indirect, environmental and in buildings) was found in 80 percent of her study cases. According to Pinheiro, the latency period (time from exposure to development of the disease) may be as long as 35 to 45 years.

Malignant mesothelioma tumors affect more men than women and is responsible for 2.2 deaths per million yearly in the United States; 7.2 deaths per million in South Africa and 15.2 deaths per million in Australia. Because so little research information is available in Brazil, mesothelioma is not considered an occupational cancer there.

Pinheiro's survey includes people who died due to pleural tumors between 1979 and 2000. Thus far, she has found 217 pleural tumors on health office records—143 (65.9 percent) of which were correctly coded as pleural neoplasm. From those, she discovered 45 to be mesothelioma tumors. From the 16 cases provided by pathologists,

11 were confirmed as mesothelioma—bringing the current total diagnoses of malignant mesothelioma to 56. She is working toward a quicker detection and less expensive method of testing for mesothelioma.

Antão's project involves a cross-sectional survey of silicosis in lapidary workers in the city of Petrópolis (population 300,000) near Rio de Janeiro. "The workers produce birds and other souvenirs from semi-precious stones, some of them for export," said Antão. "The working conditions are very poor, and despite the use of water in the machinery, there is a large amount of silica dust in the work sites."

Using respiratory questionnaires for exposure assessment, personal air sampling, lung function tests, chest radiographs and high-resolution computed tomography, Antão and his colleagues sampled 11 work sites. His preliminary results show a prevalence of silicosis ranging from 47 to 56 percent, and 14 to 27 percent for pulmonary massive fibrosis. They also found

two suspected cases of silico-tuberculosis.

"We expect to implement an educational program to increase awareness of the disease and to stimulate the use of protective equipment," said Antão. "We also want to apply changes in the exhaust system and to develop protective equipment for the workers." Antão noted a significant increase (from 15 to 70 percent) in the use of protective equipment by workers following his study.

The visit by Drs. Antão and Pinheiro was sponsored by the Western Center for Agricultural Health and Safety in cooperation with the Center for Comparative Respiratory Biology & Medicine and the Fogarty International Center of the National Institutes of Health. For more information on their research, Pinheiro may be reached by e-mail at germania@uerj.br, and Antão can be reached at vinicius@uerj.br.



**15th Annual Meeting
North American Agromedicine Consortium
"Agromedicine in the 21st Century"
November 17–19, 2002
Hilton San Diego Resort on Mission Bay**

Jointly sponsored by:
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<http://www.agromedicine.org/Agromedicine%20Annual%20Meeting.htm>

Calendar

October 4

12:10–1p.m., TB 137

Grad Student Research Seminar

Andrew Holtz, Olivia Kasirye,
Heather Kun, Jonathan Kwan,
UC Davis

November 1

12:10–1p.m., TB 137

The Role of Iron in the Biological Effects of Inhaled Particles

Anne E. Aust, professor of
Chemistry & Biochemistry, Utah
State University

November 17–19

North American Agromedicine Consortium (see page 7)

December 6

12:10–1p.m., TB 137

Key Pesticide Ergonomic Hazards for California Farm Workers

Anne Katten, California Rural
Legal Assistance Foundation

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AG10**

(Thailand from page 1)

respondents) reported using chemicals. Thailand's rural residents said they used pesticides primarily to control crop pests, while urban respondents often used pesticides to control mosquitoes, cockroaches or mice.

Participants in the study named 120 different varieties of chemicals they used. The most common purposes were for control of insects and grass, and to improve crop quality, yield or appearance. In the article "Pesticide Exposures Among Hmong Farmers in Thailand," that appeared in the Oct./Dec. 2001 *International Journal of Occupational and Environmental Health*, Kunstadter and Prapamontol, et al, noted that the large variety of chemicals is in part a result of proliferation of names of brands of chemically similar substances. For example, monocrotophos is sold under 274 names, methyl parathion under 296 names, and paraquat under 55 names. The proliferation of names, lack of consistent labeling

in Thai language, and lack of literacy, especially among women, along with the lack of knowledge of farmers concerning the dangers of specific chemicals, complicate problems of risk reduction.

During screening for cholinesterase inhibition among Hmong farmers and their families in northern Thailand, Kunstadter and Prapamontol discovered consistently high rates of "risky" or "dangerous" exposure to organophosphate or carbamate pesticides among all age groups. They repeatedly observed children without protective clothing working with pesticides or playing in the immediate vicinity of a pesticide application. They also observed pesticide spray equipment stored in homes and accessible to children. During a recent screening of children, they discovered the highest rates of dangerous cholinesterase inhibition is among those ages 1 to 9 years (39 percent) and 10-19 years (26.8 percent).

Many non-farmers and individuals in the urban samples who said they had never themselves

applied pesticides had risky or unsafe levels of cholinesterase inhibition. This disturbing data suggested to researchers that in addition to direct contact from pesticide application, widespread environmental contamination must exist in air, water or food. If so, this implies that reduction of risk of pesticide exposure will require far more than protecting farmers from exposure when they apply pesticides.

"We are reporting results of the research fully to village leaders and to study participants, and are encouraging them to participate in the development of locally appropriate methods of reducing exposure," said Kunstadter. "That includes collaboration among villagers to restrict spraying in defined areas to specific days, and organizing child care in the village to keep young children away from spraying and out of sprayed fields."

For more information on their research, please contact Peter Kunstadter at arttown@itsa.ucsf.edu, or Tippawan Prapamontol, rhxxo005@chiangmai.ac.th.

